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IS 4945-1 (1968): Cotton Twines for Fish Nets, Part I:
Twines for Gill Nets [TXD 18: Textile Materials for
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IS: 4945 (Part I) - 1968

(Reaffirmed 2003)

Indian Standard

**SPECIFICATION FOR
COTTON TWINES FOR FISH NETS**

PART I TWINES FOR GILL NETS

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1969

Indian Standard

SPECIFICATION FOR COTTON TWINES FOR FISH NETS

PART I TWINES FOR GILL NETS

Textile Materials for Fishing Purposes Sectional Committee, TDC 42

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IS: 4945 (Part I) - 1968

Indian Standard
SPECIFICATION FOR
COTTON TWINES FOR FISH NETS
PART I TWINES FOR GILL NETS

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 26 November 1968, after the draft finalized by the Textile Materials for Fishing Purposes Sectional Committee had been approved by the Textile Division Council.

0.2 This standard is based on the data for cotton fish net twines supplied by the Central Institute of Fisheries Technology, Ernakulam.

0.3 This standard contains clause 5.1 which calls for agreement between the buyer and the seller for permitting him to use his option for selection to suit his requirements.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I) prescribes constructional details and other particulars of 2 types of cotton twines used in the manufacture of gill nets.

2. TYPES

2.1 Cotton twines used for manufacturing gill nets shall be classified as 'Soft' and 'Medium' depending upon the twist imparted to the twines.

3. MANUFACTURE

3.1 **Yarn** — Cotton yarn used in the manufacture of twines shall be of the quality suitable for the purpose.

*Rules for rounding off numerical values (*revised*).

3.2 Twines—The twines and its components shall be evenly and uniformly twisted together. They shall be free from kinks and other projections.

4. REQUIREMENTS

4.1 Construction—The twines of the 2 types shall comply with the requirements of Tables 1, 1A, 2 and 2A respectively

4.2 Turns per Metre—The turns per metre values of the twines shall be determined according to 8.2 or 8.3 of IS 832-1964*.

4.3 Breaking Load—The dry and wet breaking load of the twines shall be determined according to 7.1 to 7.6 of IS: 1670-1960† using a gauge length of 20 cm. The wet breaking load shall be determined by immersing the twines for 24 hours in fresh water.

4.4 Knot Breaking Load—The dry and wet knot breaking load of the twines shall be determined by the method prescribed in Appendix A.

5. PACKAGING

5.1 Twines shall be made into hanks or cheeses as required by the buyer. If hank packing is required, the twines shall be made into hanks and a suitable number of such hanks shall be packed in bundles each weighing 4.5 kg. The cheeses and bundles shall be packed in waterproof kraft paper or other suitable waterproof material as agreed to between the buyer and the seller.

6. MARKING

6.1 Cheeses or bundles containing twines shall be marked with the following information

- a) Name of the material,
- b) Type and construction;
- c) Net weight of package;
- d) Year of Manufacture; and
- e) Manufacturer's name, initials or trade-mark, if any.

*Method for determination of twist in yarn

†Method for determination of breaking load (strength), elongation at break and tenacity of single strand of cotton yarn (by constant-rate-of-traverse machine). (Since revised)

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**TABLE 1 REQUIREMENTS OF COTTON TWINES, SOFT,
WITH ZSZ TWIST**
(Clause 4.1)

CONSTRUCTION (NOMINAL COUNT)	TURNS PER METRE		BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min		KNOT BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min			
	Outer	Inner	TEST LENGTH, kg, Min		Trawl		Reef	
			Dry	Wet	Dry	Wet	Dry	Wet
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
30 tex × 2 × 2 (or 20s/2/2)	377	1355	1.87	2.0	1.28	1.63	1.47	1.73
30 tex × 2 × 3 (or 20s/2/3)	323	1160	2.80	3.0	1.92	2.45	2.20	2.60
30 tex × 3 × 3 (or 20s/3/3)	263	940	4.20	4.5	2.91	3.68	3.3	3.90
30 tex × 4 × 3 (or 20s/4/3)	223	875	5.6	6.0*	3.85	4.90	4.4	5.20
30 tex × 5 × 3 (or 20s/5/3)	204	730	7.0	7.5	4.82	6.15	5.5	6.50
30 tex × 6 × 3 (or 20s/6/3)	185	662	8.4	9.0	5.78	7.35	6.6	7.8
30 tex × 7 × 3 (or 20s/7/3)	172	615	9.8	10.5	6.73	8.58	7.7	9.1
30 tex × 8 × 3 (or 20s/8/3)	161	575	11.2	12.0	7.70	9.80	8.8	10.4
30 tex × 9 × 3 (or 20s/9/3)	151	540	12.6	13.5	8.65	11.00	9.9	11.8
30 tex × 10 × 3 (or 20s/10/3)	145	516	14.0	15.0	9.60	12.25	11.0	13.0
30 tex × 12 × 3 (or 20s/12/3)	131	469	16.8	18.0	11.60	14.70	13.2	15.6
30 tex × 15 × 3 (or 20s/15/3)	116	422	21.0	22.5	14.5	18.40	16.5	19.5
30 tex × 18 × 3 (or 20s/18/3)	107	282	25.2	27.0	17.3	22.10	19.8	23.4
30 tex × 20 × 3 (or 20s/20/3)	101	362	28.0	30.0	19.3	24.70	22.0	26.0
15 tex × 2 × 2 (or 40s/2/2)	530	1910 ¹	0.93	1.0	0.64	0.81	0.73	0.86
15 tex × 2 × 3 (or 40s/2/3)	450	1620	1.4	1.5	0.96	1.22	1.10	1.30
15 tex × 3 × 3 (or 40s/3/3)	370	1330	2.1	2.25	1.45	1.84	1.65	1.95

TABLE 1A REQUIREMENTS OF COTTON TWINES, SOFT,
WITH ZZZ TWIST
(Clause 4.1)

CONSTRUCTION (NOMINAL COUNT)	TURNS PER METRE		BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min		KNOT BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min			
	Outer	Inner			Trawl		Reef	
			Dry	Wet	Dry	Wet	Dry	Wet
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
30 tex $\times$ 2 $\times$ 2 (or 20s/2/2)	472	1 085	1.9	1.9	1.32	1.63	1.43	1.73
30 tex $\times$ 2 $\times$ 3 (or 20s/2/3)	396	880	2.4	2.9	1.99	2.45	2.15	2.60
30 tex $\times$ 3 $\times$ 3 (or 20s/3/3)	322	690	4.3	4.3	2.99	3.68	3.23	3.9
30 tex $\times$ 4 $\times$ 3 (or 20s/4/3)	—	525	5.7	5.8	3.92	4.90	4.2	5.2
30 tex $\times$ 5 $\times$ 3 (or 20s/5/3)	250	505	7.1	7.2	4.98	6.15	5.3	6.5
30 tex $\times$ 6 $\times$ 3 (or 20s/6/3)	227	440	8.6	8.7	5.97	7.35	6.3	7.8
30 tex $\times$ 7 $\times$ 3 (or 20s/7/3)	211	400	9.9	10.2	6.96	8.50	7.4	9.1
30 tex $\times$ 8 $\times$ 3 (or 20s/8/3)	197	362	11.4	11.6	7.95	9.80	8.4	10.4
30 tex $\times$ 9 $\times$ 3 (or 20s/9/3)	185	330	12.8	13.1	8.95	11.00	9.5	11.8
30 tex $\times$ 10 $\times$ 3 (or 20s/10/3)	177	310	14.3	14.5	9.95	12.25	10.5	13.0
30 tex $\times$ 12 $\times$ 3 (or 20s/12/3)	161	268	17.1	17.5	11.95	14.70	12.6	15.6
30 tex $\times$ 15 $\times$ 3 (or 20s/15/3)	144	222	21.4	21.8	14.95	18.40	15.8	19.5
30 tex $\times$ 18 $\times$ 3 (or 20s/18/3)	131	189	25.6	26.2	18.00	22.10	19.0	23.4
30 tex $\times$ 20 $\times$ 3 (or 20s/20/3)	125	171	28.4	29.0	20.00	24.70	21.1	26.0
15 tex $\times$ 2 $\times$ 2 (or 40s/2/2)	660	1 585	0.95	0.95	0.66	0.81	0.72	0.86
15 tex $\times$ 2 $\times$ 3 (or 40s/2/3)	555	1 300	1.2	1.45	0.99	1.22	1.07	1.30
15 tex $\times$ 3 $\times$ 3 (or 40s/3/3)	455	1 030	2.15	2.15	1.49	1.84	1.61	1.95

TABLE 2 REQUIREMENTS OF COTTON TWINES, MEDIUM,
WITH ZS2 TWIST

(Clause 4.1)

CONSTRUCTION (NOMINAL COUNT)	TURNS PER METRE		BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min		KNOT BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min			
	Outer	Inner	Dry	Wet	Trawl		Reef	
					Dry	Wet	Dry	Wet
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
30 tex $\times$ 2 $\times$ 2 (or 20s/2/2)	512	1 845	1 74	1 8	1 29	1 6	1 46	1 6
30 tex $\times$ 2 $\times$ 3 (or 20s/2/3)	432	1 545	2 6	2 8	1 94	2 4	2 18	2 4
30 tex $\times$ 3 $\times$ 3 (or 20s/3/3)	352	1 260	3 9	4 2	2 91	3 6	3 28	3 6
30 tex $\times$ 4 $\times$ 3 (or 20s/4/3)	304	1 088	5 2	5 5	3 87	4 8	4 37	4 8
30 tex $\times$ 5 $\times$ 3 (or 20s/5/3)	272	975	6 5	6 9	4 85	6 0	5 45	6 0
30 tex $\times$ 6 $\times$ 3 (or 20s/6/3)	247	882	7 8	8 3	5 82	7 2	6 54	7 2
30 tex $\times$ 7 $\times$ 3 (or 20s/7/3)	230	820	9 1	9 6	6 78	8 4	7 65	8 4
30 tex $\times$ 8 $\times$ 3 (or 20s/8/3)	214	766	10 4	11 0	7 72	9 6	8 72	9 6
30 tex $\times$ 9 $\times$ 3 (or 20s/9/3)	202	730	11 7	12 4	8 72	10 8	9 80	10 8
30 tex $\times$ 10 $\times$ 3 (or 20s/10/3)	193	687	13 0	13 8	9 70	12 0	10 9	12 0
30 tex $\times$ 12 $\times$ 3 (or 20s/12/3)	175	626	15 6	16 5	11 60	14 4	13 2	14 4
30 tex $\times$ 15 $\times$ 3 (or 20s/15/3)	157	562	19 5	20 6	14 50	18 0	16 3	18 0
30 tex $\times$ 18 $\times$ 3 (or 20s/18/3)	143	509	23 4	24 8	17 30	21 6	19 6	21 6
30 tex $\times$ 20 $\times$ 3 (or 20s/20/3)	136	485	26 0	27 6	19 30	24 0	21 8	24 0
15 tex $\times$ 2 $\times$ 2 (or 40s/2/2)	715	2 575	0 87	0 92	0 64	0 80	0 73	0 80
15 tex $\times$ 2 $\times$ 3 (or 40s/2/3)	605	2 160	1 31	1 38	0 97	1 20	1 09	1 20
15 tex $\times$ 3 $\times$ 3 (or 40s/3/3)	495	1 770	1 96	2 07	1 45	1 80	1 64	1 80

TABLE 2A REQUIREMENTS OF COTTON TWINES, MEDIUM,
WITH ZZZ TWIST
(Clause 4.1)

CONSTRUCTION (NOMINAL COUNT)	TURNS PER METRE		BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min		KNOT BREAKING LOAD ON 20 cm TEST LENGTH, kg, Min			
	Outer	Inner	Dry		Trawl		Reef	
			Dry	Wet	Dry	Wet	Dry	Wet
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
30 tex x 2 x 2 (or 20s/2/2)	560	1345	1.6	1.6	1.46	1.60	1.46	1.60
30 tex x 2 x 3 (or 20s/2/3)	502	1160	2.4	2.4	2.18	2.40	2.18	2.40
30 tex x 3 x 3 (or 20s/3/3)	410	920	3.6	3.6	3.28	3.60	3.28	3.60
30 tex x 4 x 3 (or 20s/4/3)	354	780	4.8	4.8	4.37	4.80	4.37	4.80
30 tex x 5 x 3 (or 20s/5/3)	319	685	6.0	6.0	5.45	6.00	5.45	6.00
30 tex x 6 x 3 (or 20s/6/3)	288	600	7.2	7.2	6.54	7.20	6.54	7.20
30 tex x 7 x 3 (or 20s/7/3)	268	550	8.4	8.4	7.65	8.40	7.65	8.40
30 tex x 8 x 3 (or 20s/8/3)	250	500	9.6	9.6	8.72	9.60	8.72	9.60
30 tex x 9 x 3 (or 20s/9/3)	236	465	10.8	10.8	9.80	10.80	9.80	10.80
30 tex x 10 x 3 (or 20s/10/3)	225	435	12.0	12.0	10.90	12.0	10.90	12.0
30 tex x 12 x 3 (or 20s/12/3)	205	382	14.4	14.4	13.2	14.4	13.2	14.4
30 tex x 15 x 3 (or 20s/15/3)	183	328	18.0	18.0	16.3	18.0	16.3	18.0
30 tex x 18 x 3 (or 20s/18/3)	167	284	21.6	21.6	19.6	21.6	19.6	21.6
30 tex x 20 x 3 (or 20s/20/3)	159	264	24.0	24.0	21.8	24.0	21.8	24.0
15 tex x 2 x 2 (or 40s/2/2)	840	2100	0.80	0.80	0.73	0.80	0.73	0.80
15 tex x 2 x 3 (or 40s/2/3)	710	1710	1.20	1.20	1.09	1.20	1.09	1.20
15 tex x 3 x 3 (or 40s/3/3)	580	1370	1.80	1.80	1.64	1.80	1.64	1.80

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6.1.1 Each cheese or bundle may also be marked with the ISI Certification mark

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. PACKING

7.1 A suitable number of cheeses or bundles shall be placed one over the other and wrapped with a layer of waterproof packing material, such as waterproof packing paper or polyethylene film, to form a pack. The pack shall be tied with twine of adequate strength and a suitable number of such packs shall be packed in a container of adequate strength which is previously lined with one layer of waterproof packing paper (*see* Grade 2 of IS 1398-1960*). If necessary, the voids in the container may be stuffed with cushioning material to avoid damage in transit. The container shall be bound by iron hoops or wire.

8. SAMPLING

8.1 The quantity of cotton twine of the same construction and quality delivered to a buyer against a despatch note shall constitute a **Lot**.

8.2 The conformity of the lot to the requirements of this standard shall be determined on the basis of the tests carried out on the samples selected from the lot.

8.3 Unless otherwise agreed to between the buyer and the seller, the number of hanks or cheeses to be selected at random from a lot shall be in accordance with Table 3.

TABLE 3 NUMBER OF HANKS OR CHEESES TO BE SELECTED

NUMBER OF HANKS OR CHEESES IN THE LOT	NUMBER OF HANKS OR CHEESES TO BE SELECTED	PERMISSIBLE NUMBER OF DEFECTIVES
(1)	(2)	(3)
Up to 100	3	0
101 „ 300	4	0
301 „ 500	5	0
501 „ 1 000	7	0
1 001 „ 3 000	10	1
3 001 and above	15	1

*Specification for paper packing, waterproof, bitumen-laminated (Since revised)

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8.4 From each of the hanks or cheeses selected according to 8.3, five test specimens for each of the characteristics shall be tested.

8.4.1 From the test results for each hank or cheese, the average for a particular characteristic shall be calculated and compared with the corresponding value specified to determine the conformity or otherwise of the hank or cheese.

8.5 Criteria for Conformity — The lot shall be considered conforming to the requirements if the number of hanks or cheeses not meeting the requirements for one or more of the characteristics is less than or equal to the corresponding number given in col 3 of Table 3.

APPENDIX A

(Clause 4.4)

METHOD FOR DETERMINATION OF KNOT BREAKING LOAD (WET AND DRY)

A-1. TEST SPECIMEN

A-1.1 For the purpose of this test, a length of twine of approximately 30 cm cut from each cheese or hank in the test sample shall constitute the test specimens.

A-2. CONDITIONING OF TEST SPECIMENS

A-2.1 Prior to test, the test specimens shall be conditioned in a standard atmosphere at 65 ± 2 percent relative humidity and $27^\circ \pm 2^\circ\text{C}$ temperature (see IS: 196-1966*) for at least 24 hours.

A-3. APPARATUS

A-3.1 A constant-rate-of-traverse type single strand strength testing machine (preferably power-driven) of appropriate capacity, the speed of the moving clamp of which is equal to 300 ± 15 mm/min, shall be used for this test.

*Atmospheric conditions for testing (revised).

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A-4. PROCEDURE

A-4.1 Mount on test specimen on the breaking load testing machine, making in the twine a trawl knot or a reef knot in such a way that the knot is approximately positioned in the centre of the test specimen and the distance between the clamps is kept equal to 20 cm. Start the machine and carry the test to rupture. Note the breaking load of the test specimen correct to the nearest 0.1 kg.

A-4.2 Repeat the test with the remaining test specimens.

NOTE—The test shall take into account only the actual breaks which occur clear of the grips of the machine. Should rupture occur within 10 cm of either grip at less than the specified breaking load, the specimen shall be discarded and another specimen tested.

A-5. WET KNOT BREAKING LOAD

A-5.1 Repeat the procedure prescribed in A-4.1 but substituting the test specimens with the ones that have been kept immersed for 24 hours in fresh water, the test being carried out after blotting out the adhering water.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Conversion
Force	newton	N	1 N = 1 kg·1 m/s ²
Energy	joule	J	1 J = 1 N·m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V·s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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